

REMARKS

Claims 19-40 were pending and stand rejected. Claims 29 and 40 have been cancelled. Claims 19-22, 24-26, 30-33, and 35-37 have been amended. Claims 41-42 have been added. Claims 19-28, 30-39, and 41-42 are pending upon entry of this amendment.

Rejection under § 112, second paragraph

Claims 19 and 30 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. The Examiner stated that the claim language “the person class” lacked antecedent basis (Detailed Action, page 2). Applicant respectfully traverses. Claims 19 and 30 have been amended to recite “a person class” and comply with 35 U.S.C. § 112, second paragraph.

Rejection based on Heisele and Kim

Claims 19-20, 22-31, and 33-40 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Heisele in view of Kim. Applicant respectfully traverses in view of the amended claims.

On February 18, 2009, the Examiner and the undersigned attorney discussed Heisele, Kim, and proposed amendments to claim 19 that were similar to the amendments contained herein. No agreement was reached.

As amended, claim 19 recites:

A method for recognizing faces of persons, comprising:
training a system to recognize a facial component;
populating a first knowledge base with facial components and, for each facial component, the facial component's body part classification, wherein the facial components in the first knowledge base include a first set of facial components extracted from

facial identification training image data of a face of a first person at a first set of viewpoints;
determining a first set of body part classifications associated with the first set of facial components; and
determining, from the first set of body part classifications, a first body part classification that maximizes a probability that a person class of the facial components in the first set of facial components that are associated with the first body part classification is the first person.

Facial identification training image data of a face of a first person at a first set of viewpoints includes, for example, a set of images of the face of the first person, where each image shows the face at a different viewpoint (orientation) (§59¹, 107; FIGS. 9-10). A first set of facial components is extracted from this facial identification training image data and includes, for example, images of the first person's eyes, nose, and mouth at the various viewpoints (§59, 109; FIG. 11). Each facial component in the first set of facial components is associated with a body part classification (e.g., eye, nose, or mouth) (§59). The facial components and their body part classifications are stored in a first knowledge base (§59).

A first set of body part classifications associated with the first set of facial components is determined (§59). For example, if the first set of facial components includes images of eyes, noses, and mouths, then the first set of body part classifications includes eye, nose, and mouth.

Given an image of a particular facial component, a classifier can determine the probability that a person class of the facial component is a particular person. This probability can change based on the viewpoint (orientation) of the facial component (§110; FIGS. 12-13). Probabilities based on the same person's same facial component (e.g., mouth) at different viewpoints can be combined into an overall probability across viewpoints (§111; FIGS. 14-15). Overall probabilities across viewpoints are determined for each body part classification (e.g., mouth) in the first set of body part classifications (§59, 61-62, 84, 111; FIGS. 14-15, 18-19).

¹ Paragraph citations are to the application as published.

Some body part classifications yield better results than others when images of those facial components are used to identify a person. For example, it might be better to identify a person based on his mouth than based on his nose. The body part classification with the highest overall probability across viewpoints is determined (§§59, 61-62, 84, 111; FIGS. 14-15, 18-19).

Claim 19 recites, in part, “determining, from the first set of body part classifications, a first body part classification that maximizes a probability that a person class of the facial components in the first set of facial components that are associated with the first body part classification is the first person.” Neither Heisele nor Kim discloses, teaches, or suggests this claim language.

Heisele – Heisele discusses two global approaches and one component-based approach to face recognition and evaluates their robustness against pose changes (abstract). The component system detects and extracts local components of a face (abstract). The training set for the component system included images of seven heads that were rotated between -30° and +30° in depth (sections 4.2, 4.1, 3.1). Components were extracted from each image in the training set (section 4.2). Assume, *arguendo*, that the components extracted from images of one of the seven heads in Heisele corresponds to the claimed element “a first set of facial components extracted from facial identification training image data of a face of a first person at a first set of viewpoints.”

Assume, *arguendo*, that Heisele’s extracted components can be grouped according to their body part classifications and that one of these groups would correspond to the claimed element “the facial components in the first set of facial components that are associated with the first body part classification.”

Heisele does not disclose, teach, or suggest a probability that a person class of the facial components in a particular group is the first person, let alone determining a body part classification that maximizes this probability.

It follows that Heisele does not disclose, teach, or suggest the claimed element “determining, from the first set of body part classifications, a first body part classification that maximizes a probability that a person class of the facial components in the first set of facial components that are associated with the first body part classification is the first person.”

Kim – Kim does not remedy this deficiency. Kim discusses classifying each training image according to a pose class (frontal, right, left, upper, and lower) based on the direction of the head pose (§39). Each image is divided into several facial component images (§40). Assume, *arguendo*, that Kim’s training images include images of the same person that are assigned different pose classes and that the resulting facial component images correspond to the claimed element “a first set of facial components extracted from facial identification training image data of a face of a first person at a first set of viewpoints.”

Assume, *arguendo*, that Kim’s facial component images can be grouped according to their body part classifications and that one of these groups would correspond to the claimed element “the facial components in the first set of facial components that are associated with the first body part classification.”

Kim does not disclose, teach, or suggest a probability that a person class of the facial component images in a particular group is the first person, let alone determining a body part classification that maximizes this probability.

It follows that Kim does not disclose, teach, or suggest the claimed element “determining, from the first set of body part classifications, a first body part classification that maximizes a

probability that a person class of the facial components in the first set of facial components that are associated with the first body part classification is the first person.”

Therefore, claim 19 (as amended) is patentable over Heisele and Kim, alone and in combination.

Independent claim 30 (as amended) recites similar language and is also patentable over Heisele and Kim, alone and in combination, for at least the same reasons.

Rejection based on Heisele, Kim, and Viola

Claims 21 and 32 were rejected under 35 USC 103(a) as allegedly being unpatentable over Heisele in view of Kim and Viola. Applicant respectfully traverses. Additionally, for the record, Applicant traverses the Examiner’s assertions regarding the disclosure of Viola and regarding the motivation to combine Heisele, Kim, and Viola.

Viola does not remedy the deficiencies of Heisele and Kim. Viola discusses complex feature recognition (CFR), which discovers features that are effective for classifying an object across a wide variety of poses (page 7, second paragraph). The training set included 15 images for each of 10 people, where each of the 15 images had a different pose (p. 17). Each image was divided into 20 features (p. 17, last paragraph). Assume, *arguendo*, that the features from images of one of the 10 people in Viola correspond to the claimed element “a first set of facial components extracted from facial identification training image data of a face of a first person at a first set of viewpoints.”

Assume, *arguendo*, that Viola’s features can be grouped according to their body part classifications and that one of these groups would correspond to the claimed element “the facial

components in the first set of facial components that are associated with the first body part classification.”

Viola does not disclose, teach, or suggest a probability that a person class of the features in a particular group is the first person, let alone determining a body part classification that maximizes this probability.

It follows that Viola does not disclose, teach, or suggest the claimed element “determining, from the first set of body part classifications, a first body part classification that maximizes a probability that a person class of the facial components in the first set of facial components that are associated with the first body part classification is the first person.”

Therefore, claims 21 and 32 are patentable over Heisele, Kim, and Viola, alone and in combination.

The claims not specifically mentioned above depend from claims 19 or 30 (directly or indirectly), which were shown to be patentable over Heisele and Kim, alone and in combination. In addition, these claims recite other features not included in claims 19 or 30. Thus, these claims are patentable over Heisele and Kim, alone and in combination, for at least the reasons discussed above, as well as for the elements that they individually recite.

Applicant respectfully submits that the pending claims are now allowable over the cited art of record and requests that the Examiner allow this case. The Examiner is invited to contact the undersigned in order to advance the prosecution of this case.

Respectfully submitted,
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